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L. M. YOCK

3,415,297

MACHINE FOR CHIPPING CORE LOGS AND VENEER

Filed June 20, 1966

3 Sheets-Sheet 1

FIG. 1

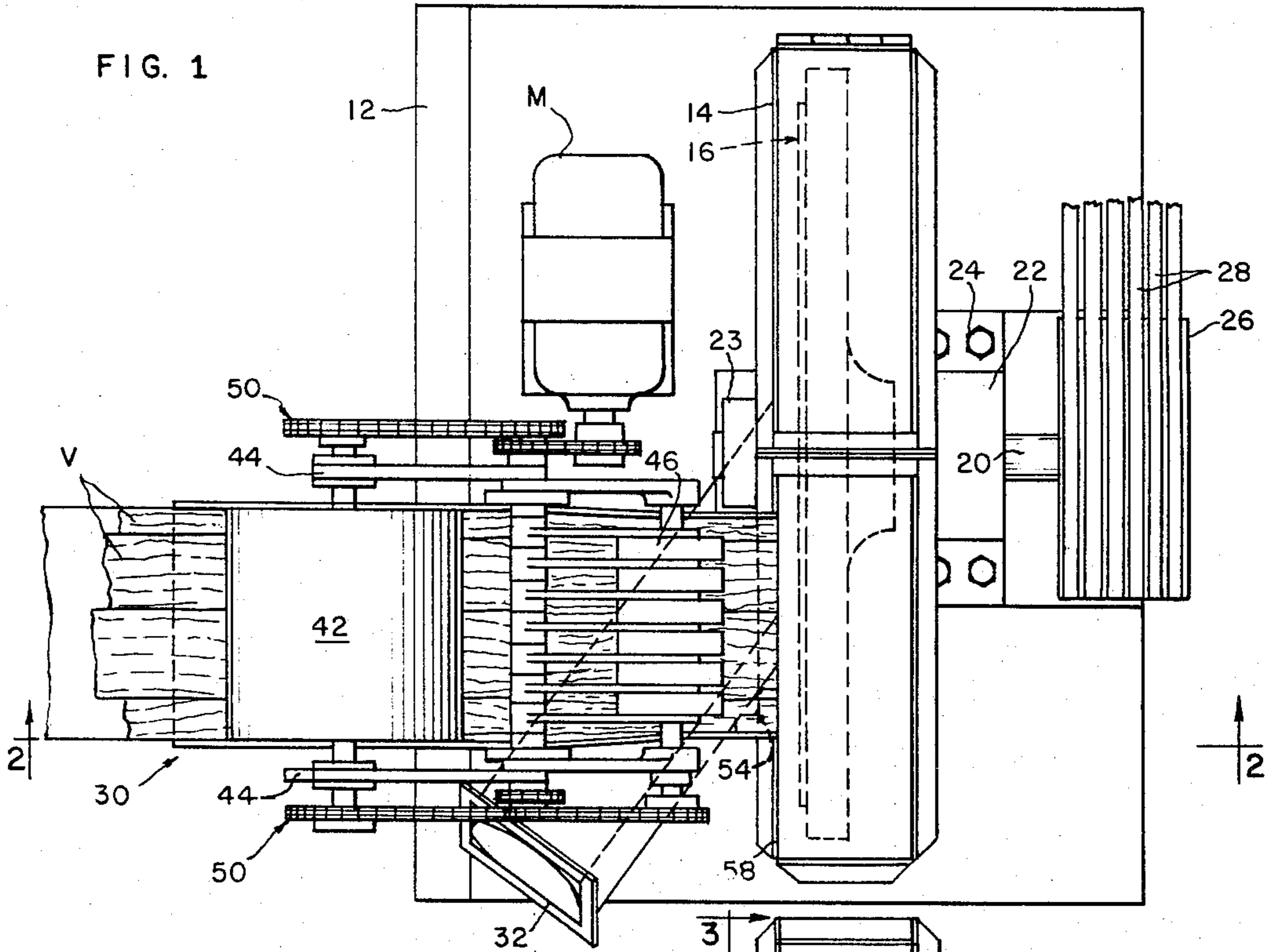
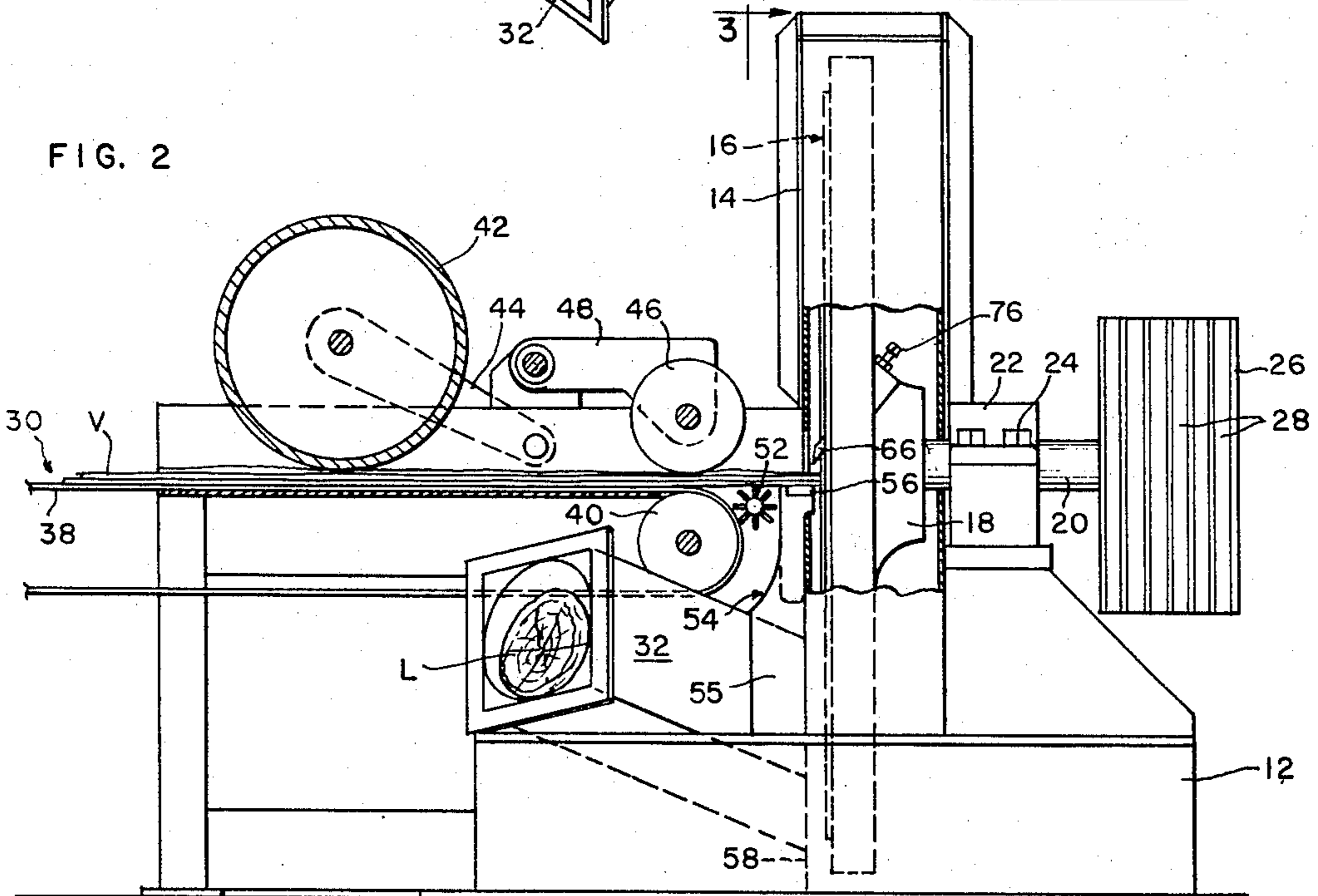


FIG. 2



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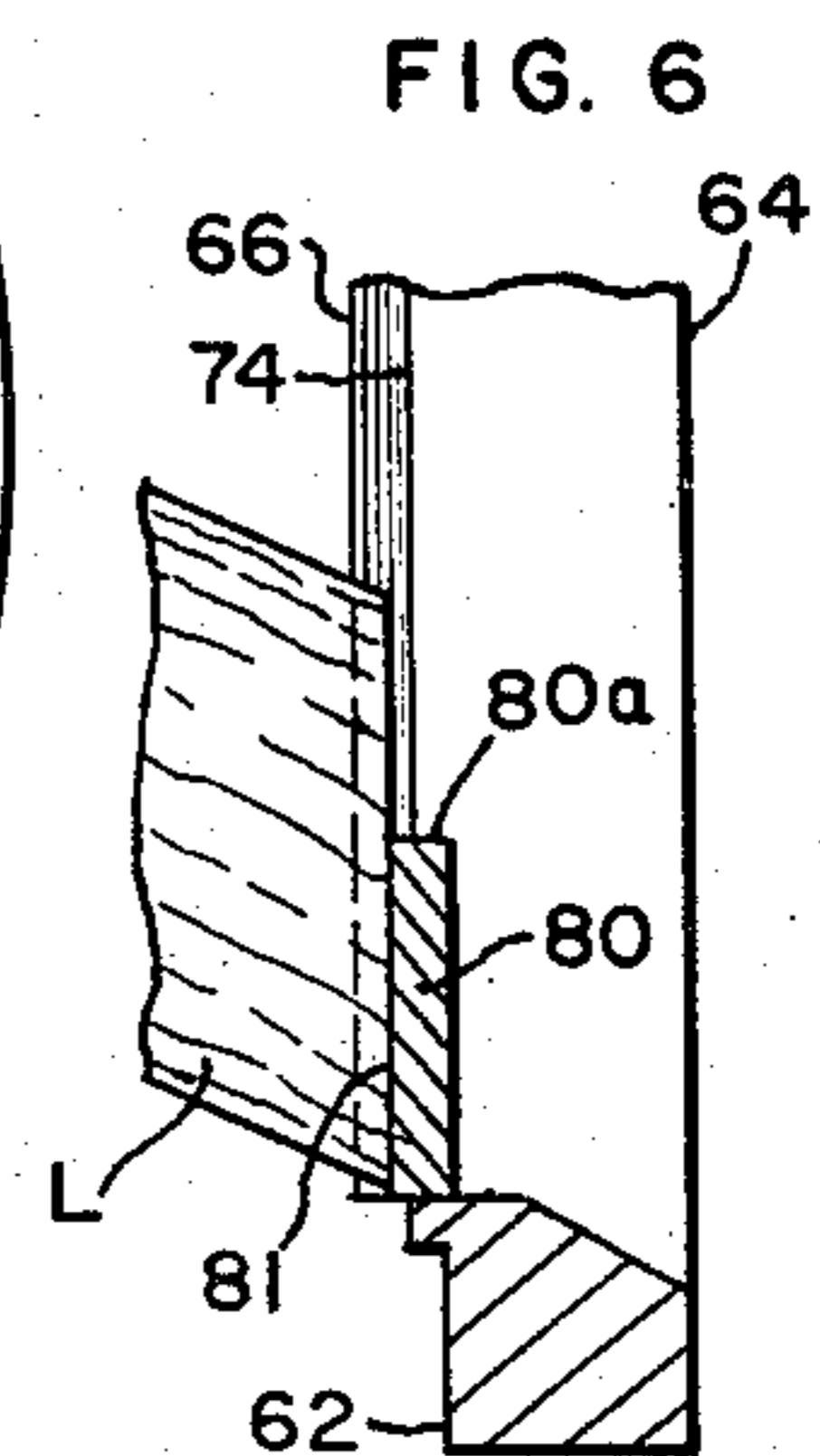
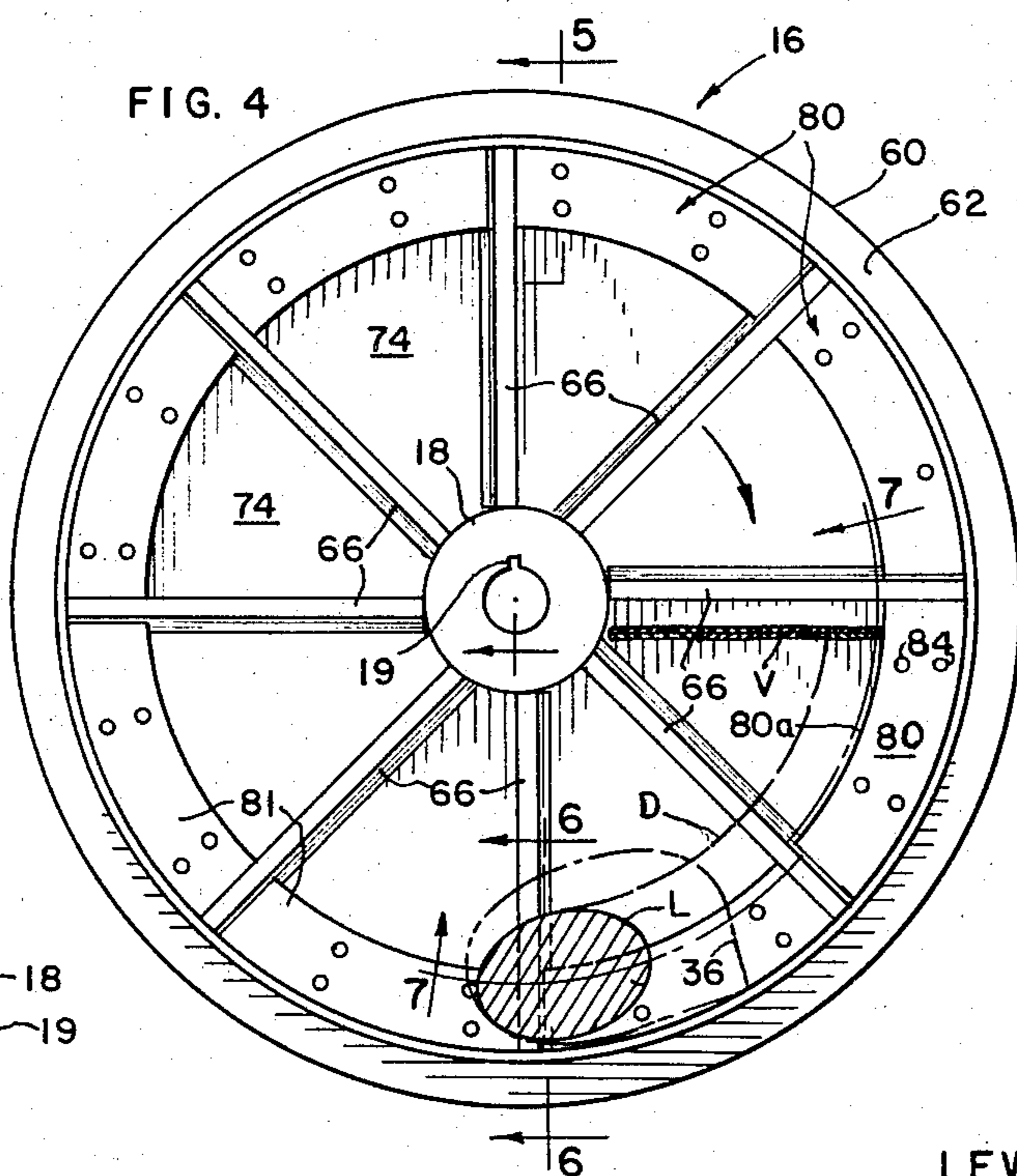
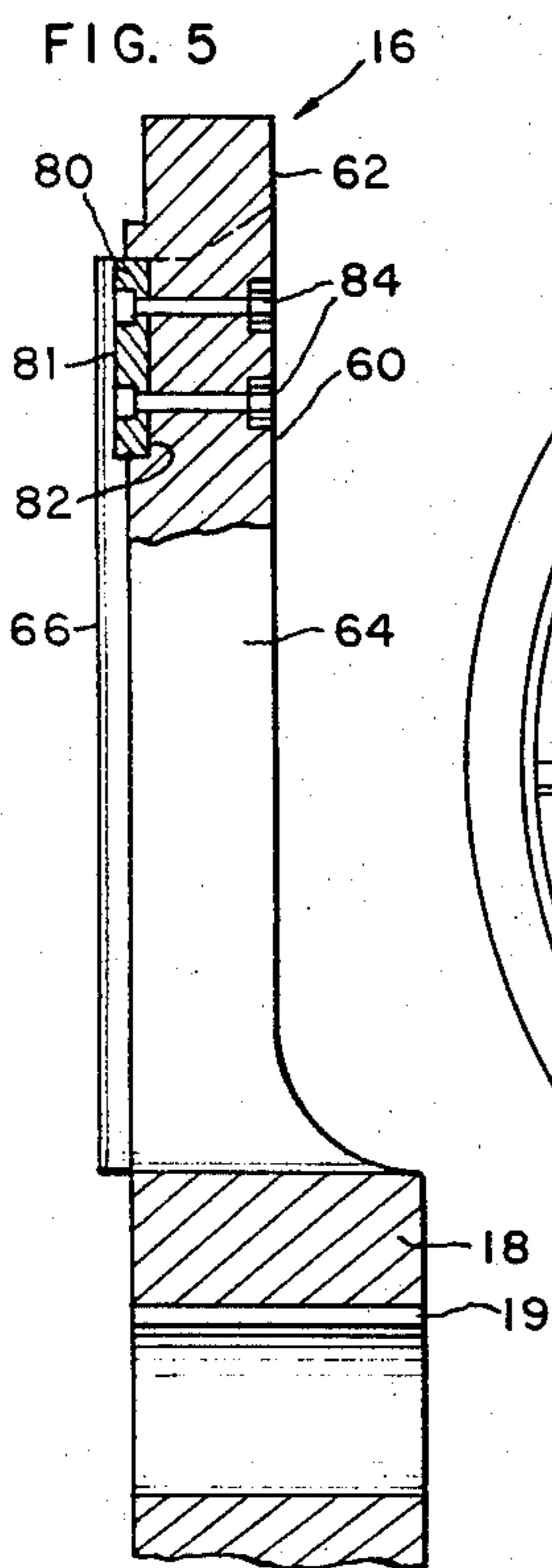
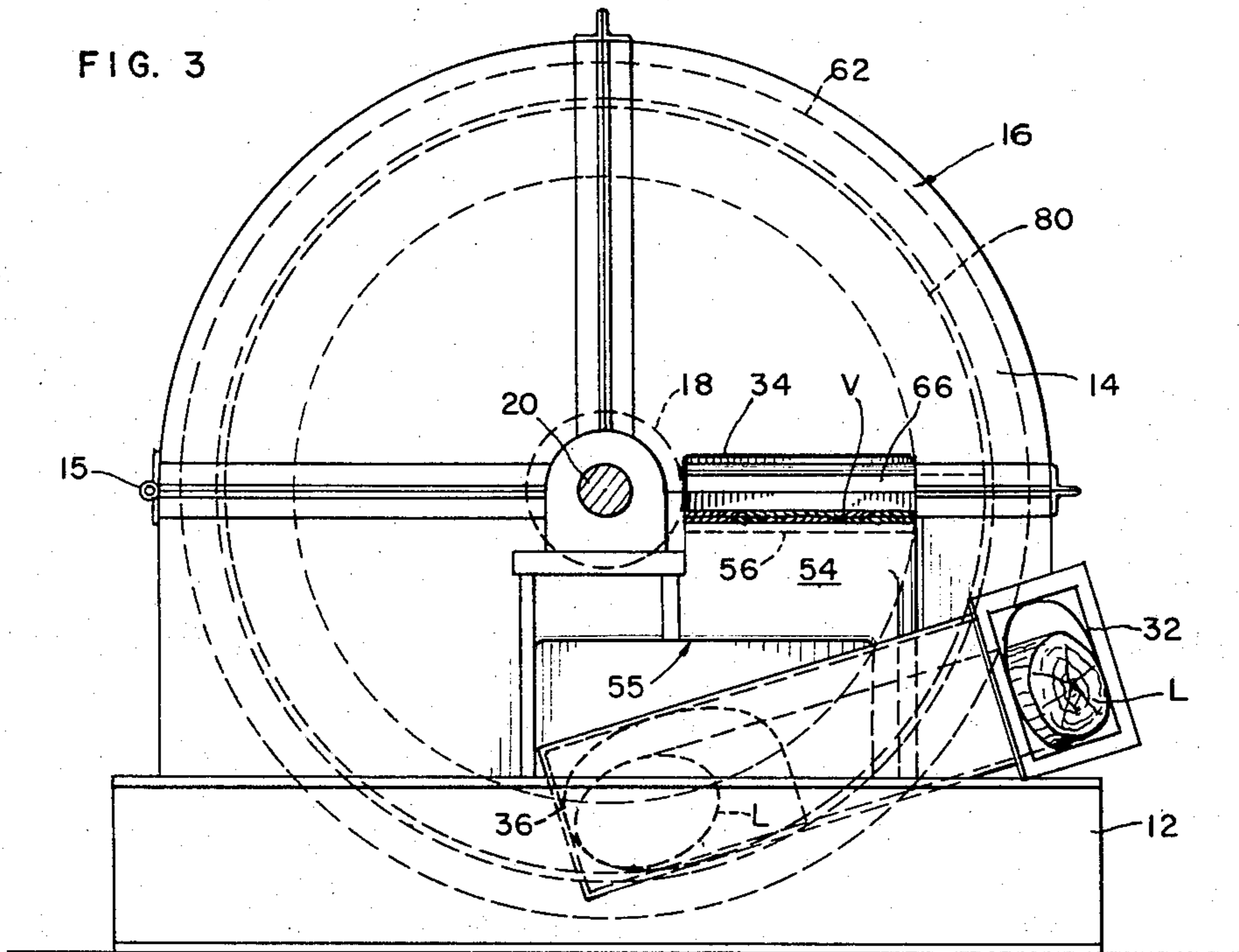
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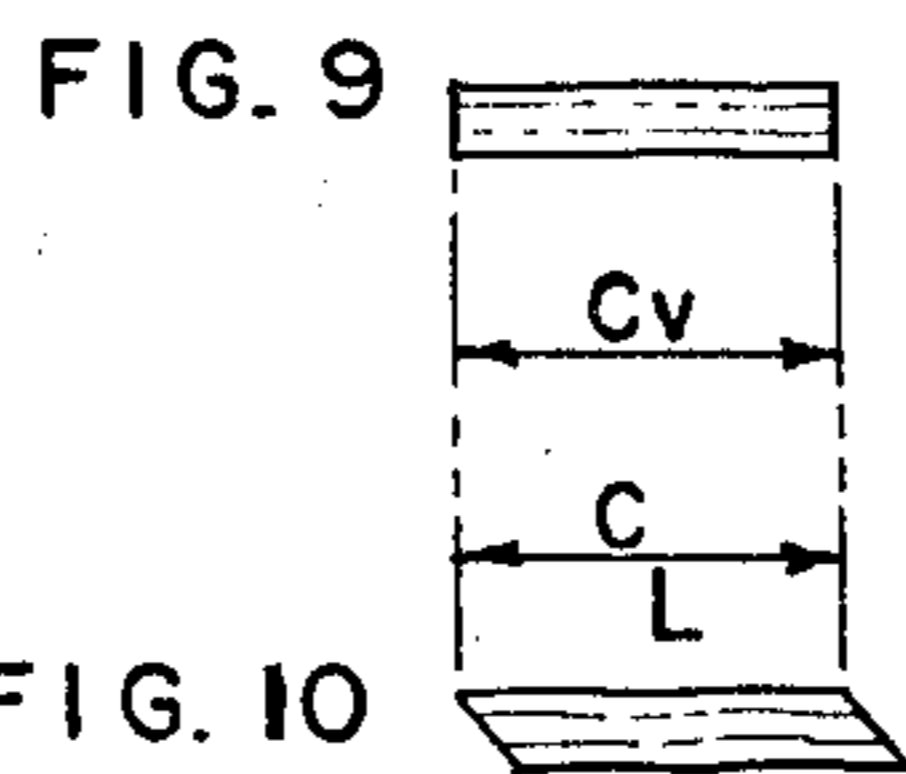
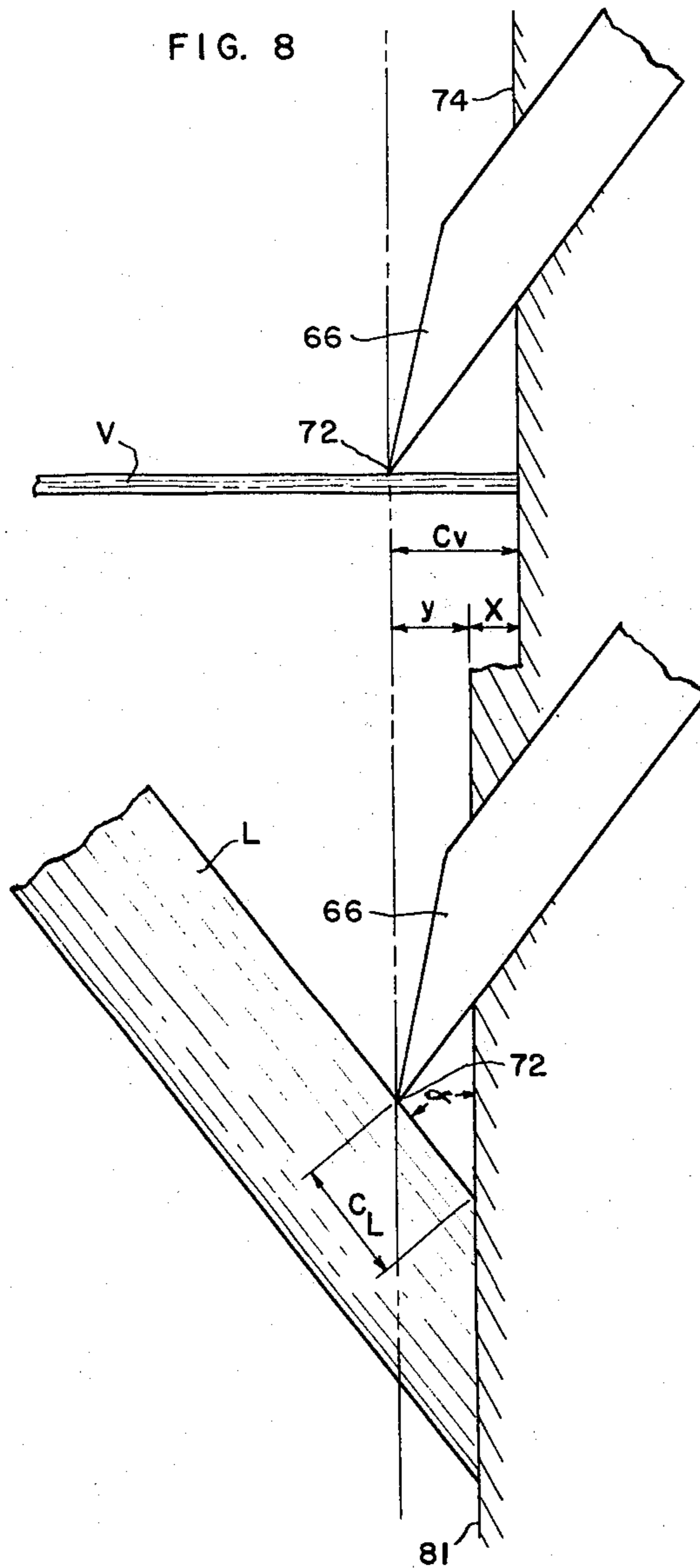
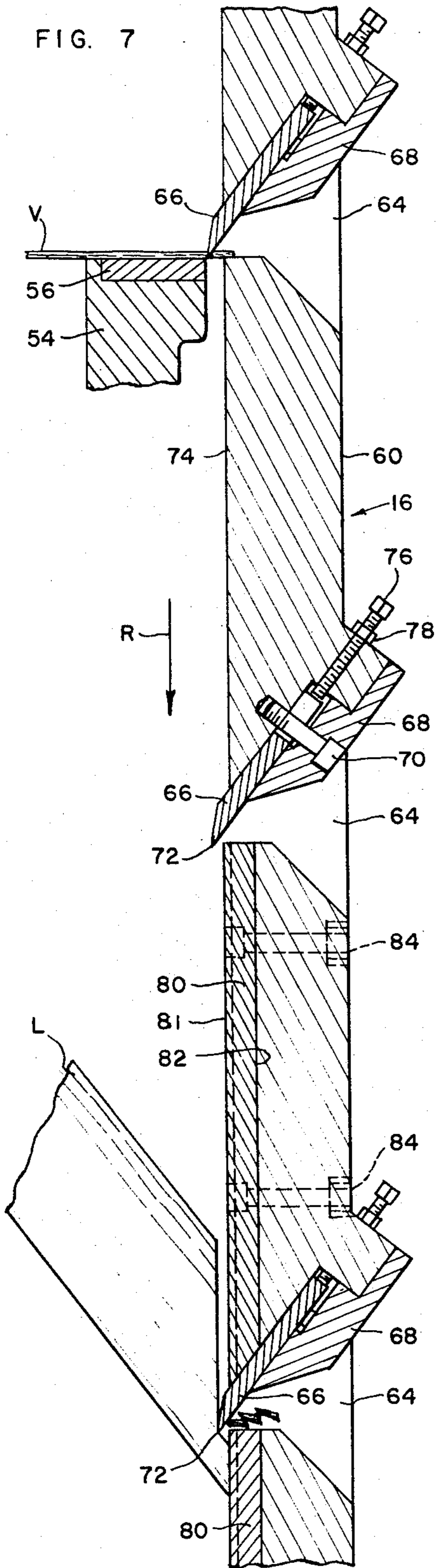
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MACHINE FOR CHIPPING CORE LOGS AND VENEER

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3 Sheets-Sheet 3



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3,415,297
**MACHINE FOR CHIPPING CORE LOGS
 AND VENEER**

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 9 Claims. (Cl. 144-176)

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This invention relates to machinery for the production of wood chips for the pulp and paper industry and, more particularly, to a machine that is capable of making such chips from the waste products of a plywood mill, such as scrap veneer and the cores of logs from which veneer is stripped.

Pulp and paper makers prefer to utilize chips that will provide fibers of substantially uniform length. To provide such chips heretofore, however, the machines that have made them from core logs and scrap veneer have been divided into two types: those that have chipped only veneer and those that have chipped only core logs. The two types of machines are similar in that each uses a disk cutter having radially-extending knives attached to the cutting surface of the disk, against which surface the material is fed. Those machines that cut chips from veneer have the infeed placed at right angles to the disk cutter; and those that cut chips from core logs have the infeed placed at an oblique angle with respect to the surface of the cutter, so that the knives can make their cuts at least partially with the grain.

No single machine has heretofore been provided that is capable of making wood chips that will provide fibers of uniform length from both core logs and veneer.

Accordingly, it is an object of the present invention to provide an improved machine that is capable of making chips from both core logs and scrap plywood veneer.

More particularly, it is an object of the present invention to provide such a machine that can make chips that will provide fibers of uniform length from either core logs or veneer.

In accordance with an illustrated embodiment, the chipper of the present invention comprises a disk cutter having a generally planar surface, but including an annular stop portion which projects from such surface toward the cutting edges of a plurality of radially extending knives mounted thereon. Means are provided to deliver the core logs at an angle to the cutting surface of the cutter so that at least a portion of a log impinges on the stop portion thereof. Means are also provided to deliver the veneer at right angles to and against the non-projecting portion of the cutting surface of the cutter. Thus the veneer is subjected to the full "bite" of the knives so as to cut chips of predetermined length. The annular stop portion functions to reduce the "bite" of the knives into a core log and is so arranged that by reason of the angular feed of the core logs, chips cut from both the logs and the veneer have fibers of substantially the same length.

Other objects and advantages of the present invention will become apparent in the details of construction and operation described in the following specification, reference being had to the accompanying drawings in which:

FIG. 1 is a top plan view of a veneer and core log chipping machine made in accordance with my invention;

FIG. 2 is a sectional view taken on line 2-2 of FIG. 1;

FIG. 3 is a sectional view taken on line 3-3 of FIG. 2;

FIG. 4 is a front elevational view of the disk cutter of the machine of the present invention;

FIG. 5 is an enlarged sectional view taken on line 5-5 of FIG. 4;

FIG. 6 is an enlarged sectional view taken on line 6-6 of FIG. 4;

FIG. 7 is a greatly enlarged developed view taken on line 7-7 of FIG. 4;

FIG. 8 is a schematic view similar to FIG. 7;

FIG. 9 is a typical veneer chip made by the machine of the present invention; and

FIG. 10 is a typical chip made from a core log by the machine of the present invention.

Referring to the drawings and particularly to FIGS. 1 and 2 thereof, the machine of the present invention has a base 12 which is adapted to be secured to a foundation of concrete or the like. A cutter housing 14 is superimposed upon and secured to the base 12. The housing 14 is hinged as at 15 to provide access to the interior thereof. (See FIG. 3.) A disk cutter 16 is rotatably mounted within the housing 14 and is secured at its hub 18 by a key 19 to a driven shaft 20 journaled in bearings 22 and 23 which are secured to the base 12 as by bolts 24. The shaft 20 is driven by means of belts 28 and a pulley 26 by a source of power, not shown.

An infeed veneer chute indicated generally by the numeral 30 and a log chute 32 are in open communication with the interior of the housing 14 by means of openings 34 and 36, respectively, whose location relative to the disk cutter 16 is best shown in FIGS. 3 and 4. The opening 34 for the veneer chute 30 is located adjacent to and slightly below the center of the disk cutter 16. Means are provided to feed sheets of veneer V to the interior of the housing 14 through the opening 34 so that they may be cut into chips, such means comprising a conveyor belt 38 having an upper horizontal flight extending perpendicularly to the disk cutter 16 and supporting the veneer sheets V to be chipped. The belt 38 travels around a driven drum 40. Mounted over the conveyor belt 38 is a main feeding drum 42 which is supported on pivotable arms 44 so as to presumably engage veneer on the conveyor belt 38 and assist in maintaining the movement of the veneer toward the cutter 16. A plurality of weighted rollers 46 pivotably mounted on arms 48 apply additional pressure to the sheets V. The conveyor belt 38 and drums 40 and 42 are powered by a motor M through a series of conventional chain drives indicated generally by the numeral 50.

The sheets of veneer V are fed by the means described onto an anvil 54, which is best shown in FIGS. 2 and 3, and against the face of the disk cutter 16. The anvil 54 comprises a rigid base frame 55 and is preferably provided with a replaceable steel insert 56 having a plane upper surface coplanar with the top flight of the conveyor belt 38, thereby to maintain the veneer sheets horizontal as they are brought perpendicularly to the disk cutter 16. A grizzly roller 52 is provided between the end of the conveyor 38 and the anvil 54 to pick up small bits and pieces of veneer which might otherwise go astray.

The log chute 32 is fabricated of steel and is secured to the base 12 and, if desired, to the front wall 58 of the housing 14 in any suitable manner. The chute 32 is adapted to convey core logs L at an oblique α (see FIG. 8) to the surface of the disk cutter 16, so that the knives attached thereto can make their chipping cuts at least partially with the grain.

The disk cutter 16, as best illustrated in FIGS. 4, 5 and 7, comprises a disk 60 provided with a peripheral rim or tire 62 and radially disposed chip slots 64 extending from the hub 18 to the rim. A plurality of radially extending knives 66 are adjustably attached to the disk 60 by knife-clamping plates 68, which plates are attached to the disk by bolts 70 (see FIG. 7). The cutting edges 72 of the knives 66 lie in a common plane and are offset from the planar cutting surface 74 of the disk 60 by an amount which can be controlled by jack screws 76 and locknuts 78. Thus the sheets of veneer V which are fed against the surface 74 are clipped off by the edges 72 to form chips of predetermined length.

The logs L are fed against the disk 60 at an oblique angle, as above mentioned. Thus, if the logs L were to im-

pinge on the same cutting surface 74 as the veneer sheets V, the length of the chips cut from the logs would necessarily be longer than those cut from the veneer. Since the length of the chips must be the same whether they are cut from veneer or from logs, the planar cutting surface of the disk 60 on which the logs L impinge is positioned parallel to and between the cutting surface 74 and the common plane in which lie the cutting edges 72 of the knives 66. This is accomplished by means of an annular stop, which comprises a plurality of annular segmental plates 80 attached to the outer peripheral portion of the disk 60 in between adjacent cutting knives, so that a planar surface 81 of the plates 80 projects from the main cutting surface 74 of the disk. The plates 80 are received into an annular slot 82 and are attached to the disk 60 by recessed head bolts 84. Thus the logs L which are fed against the surface 81 are clipped off by the edges 72 of the knives 66, as shown in FIG. 7, the knives moving in the direction of the arrow R.

As shown schematically in FIG. 8, the surface 81 of the segmental plates 80 projects from the surface 74 of the disk 60 by an amount x . The angle made by the core logs L with respect to the surface 81 is denoted by the letter α . The veneer sheets V are delivered perpendicularly to the surface 74, and the length of chip cut therefrom is denoted by c_V . The length of chip cut from the logs is denoted by c_L . Since,

$$y = c_L \sin \alpha$$

and

$$x + y = c_V$$

if we wish to make

$$c_V = c_L = c$$

then

$$x = c(1 - \sin \alpha)$$

Thus, no matter what the angle α is at which the logs L are fed against the disk cutter 16, if the surface 81 of the segmental plates 80 projects from the surface 74 of the disk 60 by an amount $c(1 - \sin \alpha)$, the length of chip c_V cut from the sheets of veneer V will be identically equal to the length of chip c_L cut from the logs L. Since the fibers run parallel to the sides of the chips, the fiber length of the chips will be substantially equal. This will be apparent from FIGS. 9 and 10.

The angle α is typically chosen to be 38° . A desirable length of chip is $1\frac{1}{16}$ inch. Under these conditions

$$y = (1\frac{1}{16})(\sin 38^\circ) = .424 \text{ inch}$$

$$x = (1\frac{1}{16})(1 - \sin 38^\circ) = .264 \text{ inch}$$

which latter distance is the amount that the surface 81 should project from the surface 74.

It will be noted from FIG. 6 that the radial dimension (which is the width) of the segmental plates 80 is considerably less than (being preferably about one-half) the diameter of the maximum size log L that will fit within the chute 32. As long as a substantial portion of the log is stopped by the surface 81, the length of chip c_L cut therefrom will be equal to the length of the chip c_V cut from the sheets of veneer.

Referring to FIGS. 3 and 4, it will be seen that the opening 34 for the veneer chute 30 extends radially across the face of the disk cutter 16 to the inner edge 80a of the plates 80. The opening 36 for the log chute 32 extends inwardly of the inner edge 80a of the plates 80. Thus, there is a substantial area of overlap on the disk cutter 16 in which both veneer sheets V and core logs L can be chipped, and this is indicated by the dashed line D in FIG. 4. The over-all diameter of the disk cutter 16 is thus considerably reduced, thereby to keep its peripheral speed and power requirements within desirable ranges.

In the foregoing description, the invention has been described with reference to a certain preferred particular embodiment, although it is to be understood that the specific details shown are merely illustrative and that the invention may be carried out in other ways without departing from the true spirit and scope of the following appended claims.

I claim:

1. A machine for chipping veneer and core logs comprising:

a disk cutter mounted for rotation about its axis; said cutter including a first planar face portion normal to said axis;

said cutter including a plurality of radially extending knives having cutting edges extending perpendicularly to said axis and lying in a common plane, said common plane being spaced a predetermined distance outwardly from said first planar face portion;

said cutter including a second planar face portion parallel to and positioned between said first planar face portion and said common plane;

means to feed veneer against said first planar face portion and perpendicularly thereto; and

means to feed core logs against said second planar face portion at an oblique angle thereto.

2. A machine as described in claim 1, in which said second planar face portion projects from said first planar face portion by an amount

$$x = c(1 - \sin \alpha)$$

where:

c is the length of chip desired, and

α is the angle at which said logs are fed against said second planar face portion.

3. A machine as described in claim 1, in which said core log feeding means comprises a chute mounted at said oblique angle to said second planar face portion.

4. A machine as described in claim 1, in which said veneer feeding means comprises a chute mounted perpendicularly to said first planar face portion.

5. A machine as described in claim 4, in which the opening for said veneer chute is located adjacent to the slightly below said axis of said disk cutter.

6. A machine as described in claim 1, in which said second planar face portion comprises an annular stop attached to said disk cutter.

7. A machine as described in claim 6, in which said annular stop is disposed on the outer peripheral portion of said disk cutter.

8. A machine as described in claim 6, in which said annular stop has a radial dimension less than the diameter of the maximum size log to be chipped.

9. A machine as described in claim 6, in which said annular stop comprises a plurality of annular segmental plates attached to said disk cutter, each of said segmental plates being attached to said cutter in between adjacent cutting knives.

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U.S. Cl. X.R.